VOLUME ONE, NUMBER TWO, FEBRUARY, 1980

THE EIGHTY

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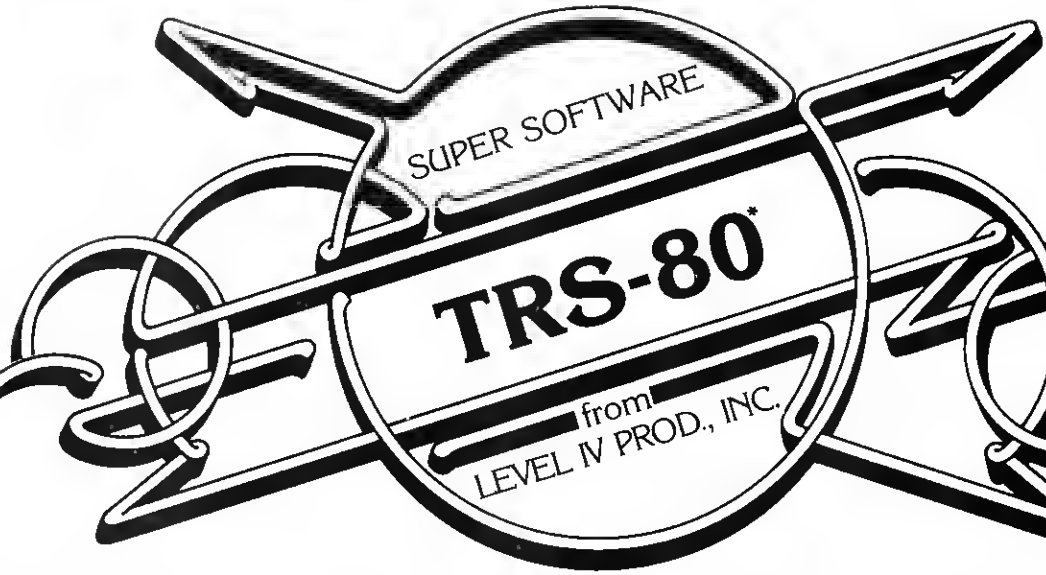

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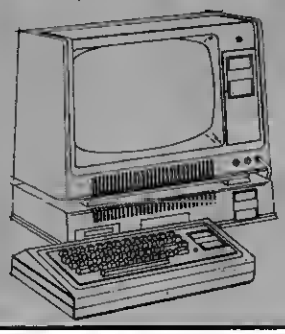

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Price includes Percom PATCH PAK™ described elsewhere in this ad.

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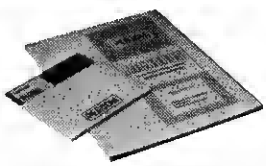
Pilon-10™ ..... $1.95 ea
Pilon-30™ ..... $1.99 ea



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MICRODOS,™ an advanced, easy-to-use operating system for TRS-80s* using Percom disk storage systems, *works entirely with Level II BASIC commands*. MICRODOS™ replaces primitive TRSDOS*, is more powerful and faster, yet resides in only 7K bytes of RAM. Up to 10 user-defined functions may be added to existing functions, and hexadecimal constants may be used in expressions. MICRODOS™ is supplied on a system minidiskette that also includes three self teaching BASIC language programs: (1) a file management program, (2) a disk utility program — illustrating how disk utilities may be written with only a few BASIC statements, and (3) a sample application program. The application program is an expandable, user accessible "notebook" of information about MICRODOS™ BASIC statements. Price $29.95

PATCH PAK™ is supplied free (on disk) with the purchase of a Percom TFD-100™ or TFD-200.™ PATCH PAK™ extends TRSDOS* to accommodate 40- and 77-track drives. It also deglitches TRSDOS* 2.1. With the patch applied to TRSDOS* 2.1, interference with disk operations from the TRS-80* "heartbeat" pulse is eliminated, as is premature stopping of the drive motor during operation — a problem sometimes referred to as "silent death." PATCH PAK™ is applied to your system disk "on the fly" using two drives. Application instructions are included.
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new DOS	$49.95
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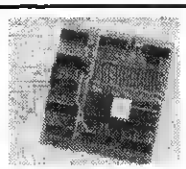

This PC board plug-in adapter for the TRS-80* virtually eliminates data read errors (CRC error — Track locked out!) which occur on high density inner disk tracks when clock and data bits are not reliably separated during playback. This problem has plagued many TRS-80* systems. The SEPARATOR™ is installed in the Expansion Interface without modifying the host system. Caution: Opening the TRS-80* Expansion Interface may void the limited 90-day warranty. Price $29.95

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Editorial!

We have been astonished at the quality of recent software for the TRS-80*. Highly sophisticated, thoroughly debugged programs that are carefully tailored to particular applications are starting to appear in quantity. Here is a list of some of the best.

THE ELECTRIC PENCIL by Michael Shrayer Software. We use this highly sophisticated text editor in-house to prepare copy for our magazines. It has powerful search and edit functions, and with a little extra knowledge, can even be used to edit BASIC programs.

NEWDOS from Apparat and VTOS 3.1 from Virtual Technology. It is a sad comment on the ineptitude of TANDY CORPORATION that we must be so appreciative of disk operating systems that work! But after TRS-DOS miserable attempts 2.0, 2.1, 2.2, and 2.3, we have come to really appreciate the other systems.

ST80D from Lance Micklus, Inc. This communications package turns your microcomputer into a smart terminal for a maxicomputer. It provides the necessary control codes, allows you to redefine keys, edit, send information to and from diskette, dump directly to printer, and edit received files, with many other features.

APL80 from TSE. This powerful language comes with tutorial material and is a logical choice for many engineering and scientific applications. The lack of the APL character set on the TRS-80* is a stumbling block, but it does not take long to learn the new representations.

CCA Data Management System from Personal Software. This is a sophisticated data base manager with a comprehensive manual, excellent editing routines, selective reporting, flexible report formats, computational abilities, and many special features.

With all this magnificent software available, it is time for some other computer manufacturers to produce compatible systems. TANDY seems to be determined to alienate customers with production shortcuts such as the deliberate elimination of lower case and the absence of a data separator on the Model 1 and the unreliability of the Model II. Just the other day I tried to install an RS-232 board in my expansion interface only to find a note from Radio Shack. This is my loose translation of the notes:

Ha Ha! We gotcha! We ran out of parts and shipped this out without connectors, hoping you would never notice. If you take your computer to your local repair center, we will order a connector for your RS-232. Why don't you buy another computer to use in the meantime?

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Articles, Reviews, and Press Releases are welcome and will be published as space permits. No compensation is offered for commercial submissions. Individual authors are compensated at $20 a page.

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In any version you move from one location to another. The locations can be as varied as caverns, islands, or rooms in a house. You take or use objects in these locations either immediately, or carry them with you for later use. For example, a key found in one place may unlock a door in another. By collecting and using these items you strive to accomplish your mission which differs with each adventure.

Also, you interact with the program using short sentences like TAKE KEYS, THROW AX, etc. Part of the fun is figuring out what words the program understands.

The "adventure" is figuring out the mystery - how to complete your mission. This makes adventure like a crossword puzzle, a mystery novel, and more. All require 16k, Level II.

adventure

from Adventure International

Scott Adams has authored seven different machine language Adventures for quick responses. They support the optional lower case hardware, have a unique screen video driver with blinking cursor for easy reading, and have over a 100 word vocabulary. They are highly recommended by 80-US, insiders, and 80 Software Critique.

1. ADVENTURELAND: Most like the original with caves, maze of pits, magic words and the dragon. $14.95
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8. PYRAMID OF DOOM now available!

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All four on disk for $35.00

dog star adventure

by Lance Micklus from TRS-80 Software Exchange

Aboard an enemy battlestar you try to rescue the princess, find the plans, retrieve the treasure and blast off. $9.95

treasure dungeon 2

by David White

Fight with the Savage Minataur, ghouls, trolls, and other monsters to get their guarded treasure. But know when to withdraw. $7.95

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The program will sort over 600 records on a single diskette in seconds! Not minutes. Not hours. Retrieval is in either alphabetic or zip code order plus other criteria. Labels are printed in either standard or unique user defined label formats. And an optional message line is available. Also, it supports both company names and international addresses.

Each record consists of name, address, phone, and category codes. With the proper codes, thousands of sublists are possible. And, editing is simple.

Mail/File is excellent for customer billing, newsletters, direct mail, collection agencies, clubs, and many other organizations. A complete package on disk for $99.00.

temple of apshai

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edtasm DISK**MOD PATCH

by Roy Soltoff from Misosys

This machine language program modifies your copy of the Radio Shack Editor/Assembler for use with your minidisk and disk operating system. You can save and load both text source and assembled object files. You can read the directory and the space used and available while in the EDTASM. You can also kill files. It is a complete disk modification for one or more drives.

Other capabilities are also added. The block move command relocates a section of text to any other area. The global change command permits, for example, changing a label throughout the text. The pagination feature provides hardcopy on 8 1/2 by 11 pages on either single sheets or continous paper. In addition, high memory can be reserved, like in BASIC, for machine language routines like printer drivers. You can also display the amount of memory remaining.

The <CLEAR> key is functional, the symbol table is sorted alphanumerically and output 5-across, the scroll up/down allows 15 lines on the screen, and the 'DEFM' assembly is improved. Lower case input is now permitted. Plus, you can branch to any address.

Upgrade your Editor/Assembler today. $19.95

ATERM

by Tom Stibolt from Acorn Software

The complete ASCII terminal program with the features you need and want: truly full duplex, completely compatible with Radio Shack's RS-232, all 128 ASCII characters from the keyboard, support of lower case if a modification is made, and BELL sound on AUX line from the computer.

You can set baud rate, parity, word length, and number of stop bits from the keyboard, even while receiving. Output to the lineprinter is buffered in the computer's remaining memory so printers slower than the RS-232 can be used. Completely compatible with Radio Shack's communications package. Level II with modem. $19.95

GSF

from Racet Computes

A collection of fast, easy-to-use machine language routines: in memory sort with multiple variables and keys, array read/write to tape; compress, uncompress and move data, screen scrolling in any direction, save screens, and more. Thorough documentation and two BASIC programs with multiple examples on the tape. Specify 16, 32 or 48k when ordering. $24.95

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PURE & SIMPLE

Bill York

I come to you not as a prophet.....

A very hearty welcome to the pages of 'The Eighty' Magazine. Now that the holidays have passed, it gives us a moment to reflect on the events of the preceding decade, and ponder what the future has in store for us as an industry. Without question the WORLD POWER scheme dominated the picture, but it just might be possible that the end result will prove to be positive to all of us. The industry badly needed an 'issue' to pull everyone together and form a unified body to oversee the goings on, and WORLD POWER provided us with that reason. M.I.T.A. (Microcomputer Industry Trade Association) created a watchdog group to closely scrutinize new entries into the field and at the same time started plans to draft a policy on software piracy. M.I.T.A. is a group made up of the best people the industry has to offer, and they should be heartily supported.

If you haven't read Harvard Pennington's book 'TRS-80 Disk and Other Mysteries', it's high time you did. The book was written using the 'Electric Pencil' and is very easy reading. It provides essential information for anyone who seriously uses his TRS-80 system. I understand that it just entered its second printing.

Speaking of the 80's, I'm very interested in what **you** feel the 80's have in store for us as an industry - write or call and let me know. I intend to use the space in this column to provide you with timely information...and some good insight that will be of benefit to all of us. I'm not planning any junkets to Asia or France, but with any luck I will attend most of the major shows, and will relay what's 'hot', and the best prospects for the future.

I feel very strongly that the 80's will reveal to the 'Supercomputers' the real strength of the Microcomputer concept. The 70's showed the strength of the Z-80, 8080, and 8085 chip in engineering applications, and Radio Shack's jump to the 6809 speaks for itself.

I just finished reading an article by Sidney Fernbach in the January issue of **COMPUTER WORLD**, entitled, 'Great Hardware Advances of the 70's, in which he discusses everything from the IBM 4000 to expanded peripheral equipment...and never mentions Microprocessors. If we are to believe Mr. Fernbach, we really have our work cut out for us.

I understand from some of our people who are attending a show in Las Vegas, that a new microcomputer manufactured in Hong Kong is on display. It seems high time that the American manufacturers take a hard look at the Asian and European markets before it's too late.

Now that you have had a chance to read our first issue, and are about to read the second, please let me know what you think. We are very receptive to criticism from our readership...it's the only way we can improve with each issue. It's **your** magazine, we'll do all the work.

Please feel free to send in any product releases you would like to have us run for you, and we'll get them in as soon as possible. Send your material to:

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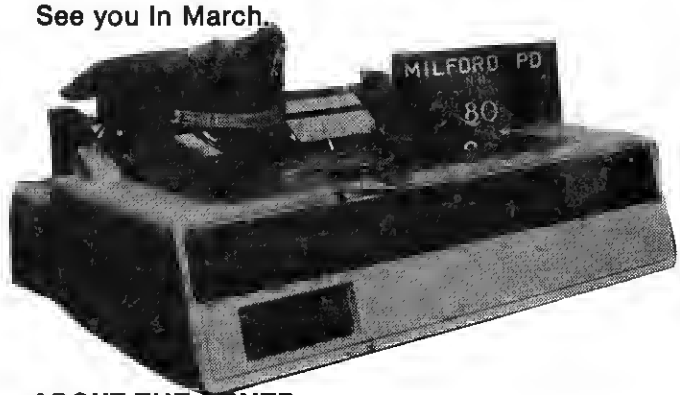
I'll look forward to hearing from many of you in the near future.

See you in March.



ABOUT THE COVER...

Nothing can be more disturbing than typing a page of text and having your printer decide to be uncooperative. Future issues of **THE EIGHTY** will devote editorial space to printers with the theme "Don't get locked up with printer problems". Our cover "prisoners" are a CENTRONICS 700 printer and Lester Anderson of our staff. Our special thanks to the Milford, New Hampshire Police Department for allowing us to use their facility.

Software for the TRS-80

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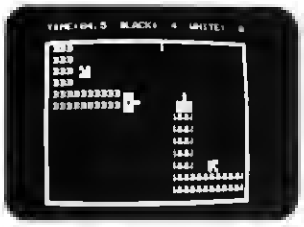

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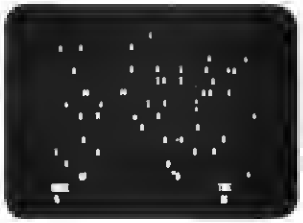

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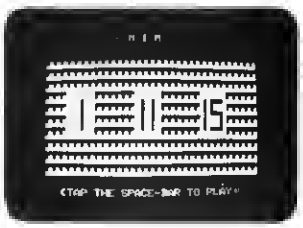
MAZE-80 $ 9.95

ANY SORT 3 $29.95

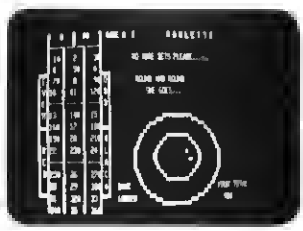


NIM $ 6.95

PENTOMINOES $ 9.95

TRS-80 TIELINE

TRS-80 TIELINE is an extended smart terminal program. Functions supported with this package are the ability to send and receive BASIC data and programs. A fully supported set of timeshare ASCII control keys are software selectable. 'ESC' and a 'BREAK' key function do not require any hardware modifications. Smart functions make it possible to jump from mode to mode with communication prior to program transmission or reception. Half and full duplex modes as well as line feed transmission or suppression, baud rate, parity, word length, stop bits are software selectable and can be changed while running. A printer can be connected for hard copy of communications as well as LLIST at baud rates that include 134.5 baud for certain serial printers. A special host or source mode allows other computers to use the TRS-80 TIELINE as a timeshare style computer. Programs can be run as well as disk files loaded, saved or transmitted by control from the distant computer. Character echo-back is supported. Host override of forbidden commands is possible. An additional feature allows testing of the TRS-80/RS232 hardware. The program is available for OOS 2.0 - 2.2 machines with 32K memory, RS232 board and modem. Additionally, the package includes a free copy of 'THE TRS-80 OATA COMMUNICATION HANOBOOK' by Stephen Gibson. The handbook is a compilation of terms and in-depth explanations of data communication from the standpoint of the user, the hardware, and the phone company. Various phone line services are detailed. Baud rates, bits and codes are explained at hobbyist level. How a Bell 103 modem works and how to connect it is covered with emphasis on originate and answer frequencies, duplex, half-duplex and RS232 conventions. The EIA standards are given with ASCII control character set information.

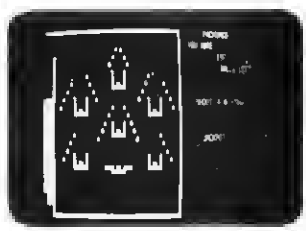


ROULETTE $ 6.95

ARITHMETIC $ 6.95

THE I CHING THING $ 6.95

COMPUTER MINDREADER $ 6.95



PACHINKO $ 6.95

TIELINE	$24.95
TRS-80 DATACOMM HANDBOOK	$ 5.95

All orders include 3% postage and handling with a minimum of $1.00. California residents include 6% Sales Tax.

VISA MASTERCHARGE

TRS-80 IS A REGISTERED TRADEMARK OF THE TANDY CORP.

15 NUMBERS $ 6.95

CONCENTRATION $ 6.95

PROGRAMMA INTERNATIONAL, Inc.
3400 Wilshire Blvd.
Los Angeles, CA 90010
(213) 384-0579
384-1116
384-1117

Dealer Inquiries Invited

QUIZMACHINE $ 6.95

DBM/5 $49.95

PROGRAMMA Software Program Products

READER SERVICE Y 7

New Products

The Eighty is happy to publish information about new products releted to the TRS-80*. We cannot be responsible for the accuracy of the information presented here, and those with questions are esked to contect the indicated companies directly.

*Trademark of Radio Shack Division of Tandy Corp

PERSONAL SOFTWARE ADDS GAME PRODUCT LINE

Two new software packages for personal computers — Checker King and Gammon Gambler — are being introduced in early 1980 by Personal Software Inc.

Checker King and Gammon Gambler bring to five the number of sophisticated strategy game programs available from the two-year-old software publisher.

Checker King plays at eight levels of skill selected by the user and changeable during the game. During the play, the program checks each move for legality and displays it as a flashing checker piece on the video screen's graphic checkerboard. Checker King also sets aside three memories for storing interesting board positions or problems for later study.

Available on cassette, Checker King will run on the Apple II or Apple II Plus, the TRS-80 Level I or II, and Commodore's PET or CBM computers. It retails for $19.95.

Gammon Gambler plays at any of ten levels of difficulty to challenge the unskilled to highly skilled. Developed using the same "artificial intelligence" programming techniques as Checker King, the program includes the seldom-found doubling cube, which serious backgammon players consider the game's most interesting feature.

Like other Personal Software strategy games, Gammon Gambler includes a finely-tuned human interface. It plays by standard U.S. tournament rules, checks moves for legality, and flashes every moving piece on the video screen's graphic backgammon board.

Gammon Gambler will be available initially on cassette for Commodore PET and CBM machines, and soon after for the Apple II. The program retails for $19.95.

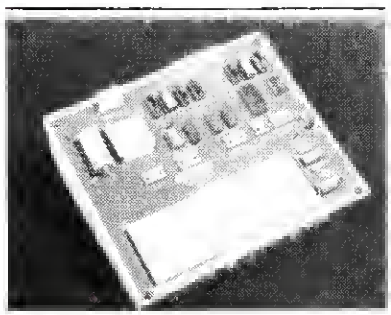
The other three Personal Software strategy games are:

Microchess, the first software package to surpass the industry's "gold cassette" sales level of 50,000 copies;

Bridge Partner, a program that pits a player and a dummy partner against the computer in four-handed contact bridge; and

Time Trek, a real-time action game that tests one's survival skills while at the helm of a galaxy starship.

Personal Software products are available at more than 450 dealers, the industry's largest software retail distribution network.



TRS-80* ACCESSORIES FOR INTERFACING AND CONTROLLING PERIPHERAL DEVICES

The TRS-80* Breadboard, a hardware device, allows the microcomputer user to design custom interfaces by which peripheral devices can be connected to the TRS-80*. The TRS-80* Breadboard contains bi-directional data bus buffers, a logical probe, a solderless breadboard, and an eight-device address decoder that can be used for either accumulator I/O or memory mapped I/O. The user can select not only the mode of operation for the device address decoder but also the four or twelve most significant bits of the device address. Therefore the device address decoder can be "mapped" to any block of eight continuous accumulator or memory-mapped I/O addresses. Because the bi-directional data bus buffers transfer data to the TRS-80* only when an input device signals and microcomputer signals will interfere with each other on the bus. The Breadboard allows the user to communicate with control signals in the TRS-80* microcomputer not otherwise readily accessible. It can be used with 4K Level II TRS-80's* up to dual floppy disk 48K Level II systems.

TRS-80* Interfacing, a 190-page text book by Dr. Jon Titus, instructs the TRS-80* Breadboard user in the construction of device address decoders, input ports, output ports, and synchronization signals. Hardware interfaces and software listings are shown for A/D and D/A converters, programmable interface chips, data loggers, a traffic light controller and a digital logic tester. The text includes 18 experiments that can be performed by the user; expected results are discussed. All programming is done in BASIC. **The TRS-80* Breadboard** and **TRS-80* Interfacing** provide the techniques required to use the TRS-80* for laboratory data acquisition and data reduction, home energy management, and unlimited number of other tasks in which one wishes to acquire data from or to control peripheral or real-world

Continued on page 9...

devices.

The TRS-80* Breadboard is available as a Parts List and Instructions for $3.00 or as a kit; kit prices range from $25 to $250.00. TRS-80 Interfacing, Book 1, is priced at $8.95 plus $1.00 shipping and handling. Virginia residents add 4% tax. VISA and Master Charge cards accepted. For further information contact: Group Technology, Ltd., P.O. Box 87, Check, VA 24072. 703-651-3153.

TRS-80 VOXBOX

Radio Shack is now offering users of their TRS-80 Microcomputer Systems a device designed to let them experiment with "voice recognition."

The TRS-80 VOXBOX makes it possible to program the computer to respond to spoken words. Words or phrases may be used to enter data, control and instruct the TRS-80 without having to type on the keyboard.

Described as a "speaker-trained, isolated-word, speech recognition system," the VOXBOX can be programmed with a vocabulary of up to 32 words. The user decides what words are to be used, and what they do (the action caused or data provided) is written into the program.

According to Radio Shack, the VOXBOX should correctly recognize 85 - 95% of the words used, provided the user takes reasonable care in speaking clearly and distinctly. However, the company does recommend that the unit be used primarly for entertainment and experimentation.

A Level II TRS-80 system with 16K RAM and cassette recorder are required for use with the VOXBOX. A machine-language "driver" program and three demonstration programs, comprehensive owner's manual and push-to-talk dynamic microphone are supplied with the unit.

The TRS-80 VOXBOX is available from Radio Shack Computer Centers and participating Radio Shack stores and dealers, nationwide, priced at $169.95.

THE GREEN-SCREEN

Micro-Mega (P.O. Box 6265, Arlington, VA, 22206) is offering a Green-Screen which fits over the CRT of your TRS-80 Video Display and gives you improved contrast with reduced glare. You get bright luminous green characters and graphics like those featured by very expensive CRT units. The Green-Screen is closely matched to the color and texture of the TRS-80 Video Display and improves the overall appearance of your system. It is attached with adhesive stripes which do not mar your video unit in any way.

The Micro-Mega Green-Screen gives improved Video Display visibility for all applications and is especially effective in creating dramatic, high-impact displays for computer games.

RENT-A-COMPUTER

Conneticut Information Systems will now rent TRS-80 (Models I and II), APPLE, PET, and ATARI computers. In addition, the company will also rent add-on accessories and software for the above computers. The add-on accessoires and software need not be limited to those of the above vendors: "foreign" vendors' accessories and software will also be rented.

"We can't even make up a real catalog", says Associate Director Phil Brotman. "There are so many products we can supply on rent-al, and they are increasing so fast, that it's easier for renters to simply clip the ad of the vendor and send it to us with their order".

According to the Associate Director, "Our policy is to let the user rent for any length of time, and return the item or buy it at his option. We charge 15% of the manufacturer's list price for the first month's rental, and 10% for each subsequent month. If at any time the user wants to buy the item, the purchase price is manufacturer's list, less ½ of paid-in-rent. We do ask for a 10% of list price, refundable deposit along with the order, to cover ourselves against tardy payers".

Mr Brotman says that the rental policy is being implemented to give prospective buyers a chance to see if computer products are really right for them, without wasting the full purchase price and getting "stuck".

Almost any APPLE, TRS-80, PET or ATARI related product can be rented. Contact CONNECTICUT INFORMATION SYSTEMS, 218 Huntington Rd., Bridgeport, CT 06608.

NEW SOFTWARE

MORLOC'S TOWER

Now Automated Simulations challenges PET, APPLE and TRS-80 owners to rescue an entire city from the

Continued on page 10...

fireballs of Morloc the Mad.

In MORLOC'S TOWER the player must hunt through a maze of 30 rooms — all displayed on the screen–in search of the evil and elusive Morloc, before the wizard can destroy the city of Hagedorn.

MORLOC'S TOWER combines a challenging puzzle to solve with excellent graphics and 18 real-time command options. Dozens of frightening monsters of different shapes and sizes leap from the shadows to assault the player. Three kinds of rings, a magic sword, two amulets and half dozen other treasures are hidden within the six-floor tower to aid, or hinder the adventurer.

The competitive scoring system keeps the game challenging and exciting even after many of the tower's mysteries have been revealed. Three levels of play let the user adjust the difficulty of the game, while the Book of Lore not only explains the rules, but offers some helpful hints on solving the puzzles.

MORLOC'S TOWER is available at participating Byte Shops, Computerlands and other dealers nation-wide, or for $14.95 from Automated Simulations, P.O. Box 4232, Mountain View, CA, 94040. Master Charge and VISA cards are now accepted.

B17 BAUD LOADER

ABS SUPPLIERS (P.O. Box 8297, Ann Arbor, MI 48107) has just introduced a time-saving utility for the TRS-80* Level II tape system which allows Loading, Saving & Verifying BASIC or SYSTEM programs over 3 times faster. The 'B-17' 1700 Baud Loader does not need costly equipment or hardware modifications, yet still allows the user to approach Disk I/O speeds using cassette tapes.

The 'B-17' 1700 Baud Loader allows the user to create FAST versions of their favorite software for personal user. Ancillary features include a NEW Video Action Indicator, which also lets you see the best tape load volume; foolproof Error-Trapping routines; Load & Go option that lets your program start executing automatically after loading & also allows the use of a name for Basic programs of up to (any) 6 characters long. The B-17 gives you more free time to use your computer . . . instead of **waiting** for it.

Since it is **IMPOSSIBLE TO COPY 1700 BAUD PROGRAMS** with current copying utilities it will no doubt be well-received by program authors who are interested in this valuable security feature.

SOFTWARE DEALERS interested in handling the 1700 Baud Loader should write to ABS Suppliers on their letterhead requesting Dealer Details.

PROGRAM AUTHORS! ABS Suppliers is **LICENSING** their 1700 Baud Loader for use with your Level II cassette software for sale. Our 'B-17' can boost your sagging sales with a product that loads over **3 times faster & cannot be copied** with current copying programs. Interested parties may contact ABS for Licensing Details.

ENCODER

SOLARIS PRESS, P.O. Box 516, Troy, Idaho 83871 is offering a new line of software for enciphering TRS-80 diskette based programs or files. Once your program has been coded, following the fully automatic procedure in Cipher ($19.95) or Super Cipher ($39.95), no one can possible access your program without knowledge of the password you have previously set. Perhaps the most exciting new development that Solaris is offering is the ability to set up programs for game use or business purposes as a service to authors or distributors. A program sold to the public will run automatically, without the user having to supply a password, but will still be protected. The diskette will not back up except to special diskettes which Solaris supplies at quantity prices of $4.00 per diskette.

POWERFUL PAYROLL

TRS-80 Mod I computer users now have available a quality, low priced and dependable Payroll product for their systems. Small businesses may now utilize PAYROLL products for their dual mini-disk, 32K, TRS-80 Mod I business system. Many years of experience in computer accounting products by DTI's staff is behind the Payroll and has resulted in a very user-oriented, maintainable, and self-installable product.

The DTI Payroll runs in all states with state, federal, and local taxes and employee records under setup maintenance. Other features include: monthly, quarterly, and yearly pay and hour records; user control of pay categories and taxing methods; user oriented menus and operations; recording of handwritten (after the fact) checks; departmental reporting; 50 employees per mini-diskette; a picture-like report writer for maintenance of the W-2 and 941, plus user design of special reports for departments, unions, earnings, tax, etc. Fixed (programmed) reports include: Checks and/or stubs, register, journal, employee list/records, mailing labels, and others.

Non-technical Operator's Reference Manuals are provided with each product for instruction and reference. Price (user license) is $235 and the product is available fast from DATA TRAIN, 840 NW 6th Street, Suite 3, Grant's Pass, Oregon, 07526, (503) 476-1467.

Continued on page 12...

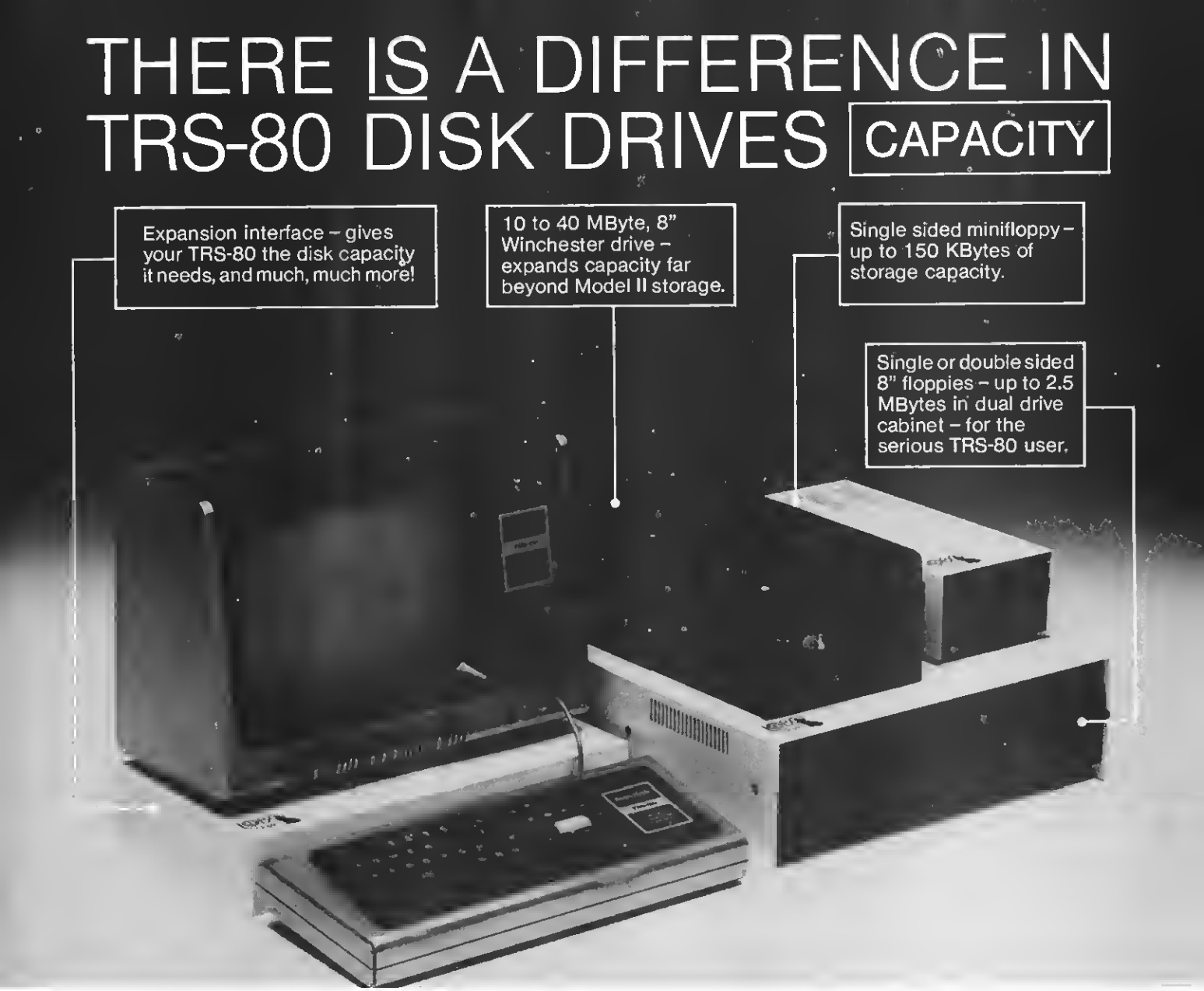
THERE IS A DIFFERENCE IN TRS-80 DISK DRIVES CAPACITY

Expansion interface – gives your TRS-80 the disk capacity it needs, and much, much more!

10 to 40 MByte, 8" Winchester drive – expands capacity far beyond Model II storage.

Single sided minifloppy – up to 150 KBytes of storage capacity.

Single or double sided 8" floppies – up to 2.5 MBytes in dual drive cabinet – for the serious TRS-80 user.



LOBO DRIVES' new family of disk memory products provides you with a choice of memory capacities you need to effectively execute the complex business software you've developed for your TRS-80*. LOBO DRIVES' selection of readily available, software compatible drives permits you to expand your inventory, payroll, customer list, and accounts receivable files as your business grows.

And LOBO DRIVES brings you more . . . a new plug-in expansion interface that provides an easy way to add hardware enhancements, communications capability, and programmable features . . . and it comes with the LOBO DRIVES famous 1 year, 100% parts/labor warranty.

Call or write for the complete LOBO DRIVES story. Find out just how competitively priced a family of high capacity drives can be . . .

LOBO drives INTERNATIONAL

935 Camino Del Sur Goleta,
California 93017.
(805) 685-4546

"CAN YOU REALLY AFFORD TO PAY LESS?"

Quantity discounts available – Dealer inquiries invited

TR-2

Yes, I want to know more about LOBO Drives and what they can do for my TRS-80. Send me information on:

- ☐ 5 1/4-in. Floppy drive
- ☐ 8-in. Floppy drive
  - Single sided
  - Double sided
- ☐ 8-in. Winchester hard disk, 10 Mbyte drive
- ☐ Double density expansion interface

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone No. _____

If dealer, provide resale no. _____

*TRS-80 is a registered trademark of Radio Shack, a Tandy Company.

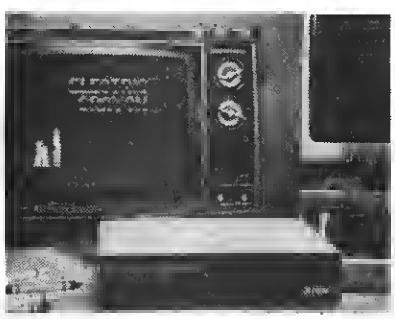
MACHINE LANGUAGE SORTS

A Generalized Subroutine Facility (GSF) is available now for the TRS Mod II. Machine Language functions available through USR calls include:

* Multi-key– Multivariable In-Memory Sort.
* Multi-key Character String In-Memory Sort.
* USR PEEK and POKE capability; both byte and word. Fetch argument.
* Compress and uncompress data.
* Move blocks on data.
* Propagate across arrays.

The sorts are extremely fast and flexible. Sort 1000 elements in six seconds! 5000 elements in 26 seconds! Carry up to 15 arrays together with multiple mixed ascending/descending keys! Sort on multiple columns in character string sort mode. Requires only one line call from BASIC.

GSF for the Mod II is available from RACET computes, 702 Palmdale, Orange, CA 92665, (714) 637-5016 for $50.00 on your DOS diskette.



PERCOM INTRODUCES LOW COST COLOR DISPLAY SYSTEM FOR TRS-80*

Designed to generate color displays on either a TV set or monitor, the Electric Crayon ™ includes its own ROM operating system, EGOS™, which accepts single-character commands directly from a parallel ASCII keyboard or program-generated commands from a computer.

As shipped, the Electric Crayon™ interfaces a TRS-80* computer, but it may be easily adapted for interfacing to any computer.

The Electric Crayon™ is in fact a complete, self-contained control computer with provision for 1K-byte of on-board program RAM, and EPROM chip for extending EGOS™ and a second dual bidirectional 8-bit port — over and above the dual I/O computer port — for peripherals.

The Electric Crayon™ has 10 display modes including an alpha-numeric-semi-graphics mode, a second higher density and semi-graphics mode and eight graphics modes. Up to eight colors may be generated, depending on the mode selected. In the highest density mode, requiring a full complement of refresh memory, the display resolution is 256 picture elements by 192 picture elements. An internal character generator generates a full 64-character ASCII subset.

The Electric Crayon™ circuitry is contained in an enamel-finished metal enclosure that is 2½ inches high by 9 inches deep by 12 inches wide. All connectors and controls are on the rear panel. The ac power cord also exits the rear panel.

The Electric Crayon™ with the EGOS™ operating system, 1K-byte of refresh memory (character-store memory) and a comprehensive users manual, an assembly language listing of EGOS™ and listings of BASIC language demo programs sells for $249.95.

Options include:

* BASIC language color graphics programs on minidiskette: $17.95
* A 34-conductor ribbon cable to interconnect the Electric Crayon™ to the TRS-80* printer port: $24.95
* RAM chips for adding refresh memory for higher density graphic modes. (The Electric Crayon™ is shipped with 1K-byte of refresh memory.): $29.95 per K-byte
* The Electric Crayon™ Sketchpad, a sketching grid of proportioned picture elements (pixels) laid out in a 3:4 TV aspect ration for either 128 x 192 or 256 x 192 graphics modes. 25-sheet pads on 11 inch by 17 inch stock: $3.95/pad

---

TRS-80* MODEL II TEXT EDITOR

The first Text Editor for the Radio Shack Model II was unveiled by the Computer Bugs, a Florida based systems group.

The Text Editor requires a 64K-byte system with one disk drive and costs $39.00, including a diskette. It contains all the features of their Radio Shack Model I Text Editor that was announced earlier this year for $29.00. The Text Editor was designed to utilize the Model II as a word processor.

A 23 line by 70 column section of the document being edited is always visible on the display screen. The document may be viewed as either white on black or with "Flip" command, black on white. Highlights include upper and lower case, the ability to move, copy or delete a line or paragraph, inserting or replacing lines, finding or changing a word or phrase, and merging multiple lines or paragraphs.

Additionally, print control commands may be optionally inserted into the document to control the formatting as it is being printed. Thus, several different formats may exist within a single document such as right justification,

Continued on page 13...

varying line length and indentations, single or double spacing, varying page lengths, and printing and centering of double sized characters.

Computers Bugs may be reached at P.O. Box 789, Boynton Beach, Florida 33-35, phone (305) 737-4738.

MAIL-M2

MAIL-M2 is an advanced mailing list system for the TRS-80* Model II computers.

It features multiple labels (up to 4) across a page, form input, a powerful report writer, fast SHELL sort, error trapping, random access, search or sort by any field, statistics, two levels of security, a sophisticated report generator, and data manipulations.

Screen input and edit features let you move the cursor, and delete character and line. This form processing capability turns your cheap terminal into an expensive, intelligent terminal. A report writer allows you to specify the report and label formats on-line. It features multiple sort keys, multiple filter criteria, field selection, record delete, and update. It allows unlimited report formats and a high degree of flexibility.

Fields include the new Zip Code extension and remark field. A selection code ranging from 0 to 32,767 is used to classify the mailing list. Any field can be used for filtering. Date field can be creation date, last referenced date or expiration date. The latter is a must for handling subscriptions.

Report generator lets you select record range, selection code range, and sort field if you do not use the report writer. The number of lines in a page, the size of the label, the width of a print line can be set by on-line command. Once they are defined, the system will 'remember'.

The user can select to print labels when a new record has just been added. Up to three messages on a label can be specified by the user on-line. A switch can be selected to change 'last name, first name' to 'first name, last name' on the label. Audit log can be used to recover data losses from power failure or hardware crashes. The word processor will get the name and address information from the data file maintained by MAIL-M2 and produce personalized letters or forms.

Unlike many programs, MAIL-M2 is not 'On-memory', and you do not have to sort the entire data base every time you add records. You can use the entire diskette for storing data. The SHELL sort is the faster one, but most other vendors use the more inefficient bubble sort. The system provides a separate module to handle sorting numeric Zip Code, and hence speed up sorting many times as compared to sorting strings. Record size is 128 characters long, so you should never run out of space. The package is priced at $99, including user's manuals, postage and a disk. A simplified version for Mod-I is available for $59. For more information, please write to: Micro Architect, 96 Dothan St., Arlington, MA 02174.

INV-V

Two of the major objectives in most inventory systems intent on earning profit are:

(1) Minimum inventory investment.

(2) Maximum customer service and/or lost-cost plant operation.

The major problem in meeting the above objectives is that they are basically in conflict. Maximum customer service means high inventory levels and hence high inventory investment. If the customer or plant operations can wait, we can provide minimum inventory investment.

INV-V is an advanced inventory control system for 32K TRS-80* disk systems. Designed to provide control functions to allow the user to maintain an efficient inventory system with improved service at low investment costs by providing efficient order strategy, and tools to measure performance. It is on-line, interactive, menu-driven and human-engineered.

'Order report' gives you all the inventory items at or below the safety levels and the associated order information, such as the order quantity, the vendor code, and the total amount in dollars. The system also indicates priority to order. For example, order out-of-stock items first, then the high-profit items, and then the high-usage items.

'Performance report' includes the tools to measure the efficiency of the inventory system and the associated costs. A summary of your system will include the total inventory cost, total number of out-of-stock items, overstocked items, etc.

Other reports include 'data base lister' and 'end-of-year processor', which also calculates economical order quantity (E.O.Q.), and compares it to the current order quantity.

In addition, a powerful report writer is provided to allow the user to specify unlimited report formats on-line without any programming. How about producing a report for all the items with stock levels more than ten items, and prices between $10 and $30 and belonging to a vendor? Up to ten of these format specifications can be saved to disk at one time.

A 9-character alphanumeric key is used for fast, keyed, random access. Unlike most other random access methods, this one lets you delete an inventory record. A fast 'SHELL' sort has been implimented. Other features include form input, live keyboard, audit log, automatic page numbering and simulated form feed.

Order entry command and usage processor calculate amounts, sales, taxes and shipping charges.

This package is priced at $99, which includes postage, a program disk, a data disk

Continued on page 14...

and a 24-page users manual. The program has been field tested and is ready for immediate shipment. Send $5 for the manual alone. For more information, please write to Micro Architect, 96 Dothan St., Arlington, MA 02174.

CAI NEWS

The Craig County (Virginia) Public Schools have recently placed L II TRS-80's in pilot programs in both elementary and secondary schools. These machines are being used with Computer Assisted Instructions (CAI) programs and educational programs.

Because of an apparent scarcity of CAI programs, K-12, school personnel and advanced secondary students are developing such programs. This process is quite slow, however, when the ultimate objective is to offer CAI in a variety of subjects at all grade levels.

They would be glad to contact schools and/or individuals interested in exchanging programs which they have developed. Write: Earl R. Savage, Craig County Public Schools, P.O Box 245, New Castle, Virginia, 24127.

NEW TRS-80* USERS GROUP!

A new TRS-80* users group is starting in Manchester, New Hampshire. The first meeting will be held in February. For further information, please call (603) 624-0089.

SWITCHABLE ISOLATOR

ELECTRONIC SPECIALISTS announces the SWITCHABLE ISOLATOR as the newest addition to their popular ISOLATOR filter line.

Featuring input Spike/Surge Suppression together with three individual switched and filtered sockets, the SWITCHABLE ISOLATOR answers requests from many Micro-Processor customers.

Total ISOLATOR Load capability is 1875 watts MAX, with each switched, filtered socket capable of handling a 1 KW Load. Each switch has an associated pilot light.

MODEL ISO-6 SWITCHABLE ISOLATOR at $119.95 from ELECTRONIC SPECIALISTS, INC., 171 S. Main Street Natick, Massachusetts, 10760. (617) 655-1532.

MOD II DEVELOPMENT TOOLS

RACET computes has assembly language programming tools for the TRS Mod II. The development package includes:

* A machine language SUPERZAP. Fast and powerful - change ASCII fields as well as hex fields.
* Patches for a disk-based Editor/Assembler and Disassembler.
* Upload service for the Apparat NEWDOS Editor Assembler and Disassembler.

The full development package is available or $100.00 from RACET computes, 702 Palmdale, Orange, CA 92665 (714) 637-5016, on your Mod II DOS diskette. Please furnish Editor/Assembler and Disassembler on your five inch floppy for upload service.

TRS-80* MODEL II CP/M**

Lifeboat Associates is now offering CP/M 2.0 for Radio Shack TRS-80 Model II computers.

CP/M, "the software bus," makes it possible to run the exisitng wealth of CP/M programs for business accounting, word processing, scientific and special application programming on the new TRS-80 Model II.

The new system has nearly 500K byte per disk with double density formatting but will read/write standard single density disks. Two special utilities are supplied which make single drive systems easy to use and back up. Both serial ports and the special parallel printer port of the Model II are easily configured into CP/M. The printer port has complete format and page control implemented in software for the standard Radio Shack printer.

The entire CP/M 2 system with complete documentation is $170.00 from LIFEBOAT ASSOCIATES, 2248 Broadway, NYC, 10024, (212) 580-0082.

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REVIEW

The Software Technical Manual

by Valen Clough

The 'Software Technical Manual' is available from Houston Micro Computer Technologies. The price of the manual when I purchased it was $49.95, however the price is now down to $40.00 according to the price list that was sent with it. The manual arrived about three weeks after I ordered it and when I opened the package to see what my $49.95 had bought, I was a bit disappointed, as it is only 40 pages long and is bound in a light plastic cover. My disappointment changed to real enthusiasim, however, when I started reading.

The first line of the introduction defines the entire manual by stating;

> 'The purpose of this manual is to provide the assembly language programmer with documentation of the TRS-80 Level II Basic ROM ENTRY points and provide working examples of their use.'

The manual meets the stated purpose in a way that enables a beginner to really understand the subjects that are presented.

The specific subjects addressed are; data handling, compares (string and numeric), arithmetic (add, sub. mult. and div.), basic functions (higher level math functions), data conversions and 1/0 (including 'EDTASM' and basic tape formats), and extending the USR function (a well documented program for multiple USR calls). In addition to these articles there are 10 examples of programs and subroutines, and 10 tables of collated information. Table 9 is the most useful. It is the Level II Basic rom map. It lists the entry points to the basic rom utilities and includes the entries for all of the Level II functions. It also documents the disk basic functions entry points.

The 'working examples' do indeed work. They are written efficiently and are well documented and discussed. The section entitled 'extending the USR function' provides the beginning programmer with an example of good assembly language programming style. The accompanying text follows the flow of the program from start to finish.

Although only 40 pages in length, the manual provides information that will help both the beginning programmer and the professional level programmer. By using the subroutines that are already existent in the ROM, programs will be shorter and the programming time will be substantially reduced. It is comparable to using a set of utility routines, but without the memory overhead.

I found that after using and reading the manual, my understanding of assembly language and the Level II ROM was greatly increased. It also helped to motivate me to tackle assembly language programming.

In conclusion, although the 'Software Technical Manual' is priced at $40.00, to the assembly language programmer, the information is almost a necessity. It also provides an answer to the question 'now that I have an assembler, what do I do with it?' So whether you are programming for fun or profit or both, the 'Software Technical Manual' can save you time and increase your knowledge of the TRS-80* Level II BASIC ROM.

The Software Technical Manual is available from:

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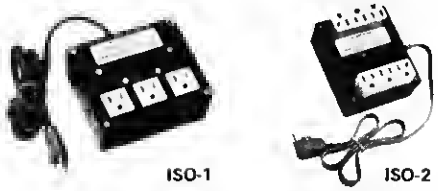

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You have been hit! You hear the dismal sound of the damage control alarm as "DAMAGE TO WARP DRIVE" and "DAMAGE TO PHASERS" flash on your screen. The Klingons have stopped firing! The Enterprise is crippled, but your best weapon is still intact, and it's your turn now! You key in the command for photon torpedoes. As your screen again displays the position of the Klingon ships, you select a firing vector from your torpedo chart and key it in. Now you hear the buzz of your photon torpedo as you see it speeding toward a Klingon ship. It strikes him dead-center! As you watch, the Klingon Battle Cruiser disintegrates, accompanied by a satisfying crackling sound.

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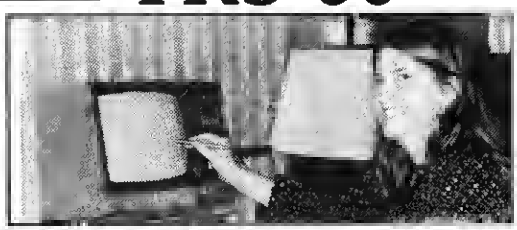

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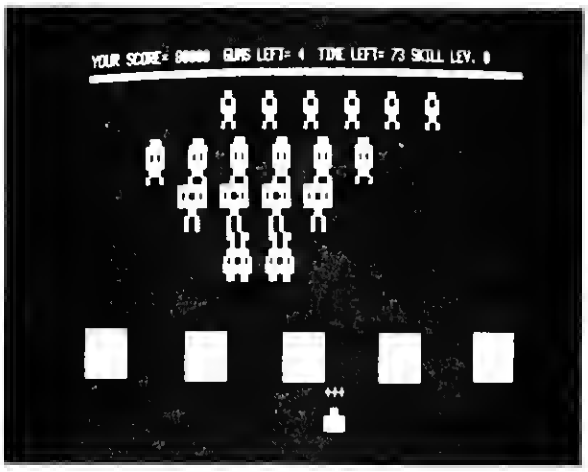

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GOING INTO BUSINESS

by Lance Micklus

I got a letter a couple of months ago from a lad who wanted a copy of my Checkers program. The letter began:

Dear Mr. Inc.

We got a big chuckle out of it. The letter now hangs on the bulletin board in my office. Obviously, my young friend did not understand what Inc. means. Do you?

Yes, it means incorporated, of course. That means there is a legal entity, registered in the State of Vermont, which has certain legal rights. It has stockholders, a board of directors, an employer I.D. number, an attorney, books to keep track of the company's business, a checking account, an accountant, a credit rating, is a member in such things as the Lake Champlain Area Regional Chamber of Commerce, and a lot of other things - all which have little to do with creating and selling computer programs.

Fortunately for me, I had some experience operating a small business. For several years I was a performing magician, and I also ran a very successful photography business. Neither was ever incorporated, and both were operated part-time. But operating anything as a full-time business is another matter.

First, there is a the question of how you will organize your business. Your options are: sole proprietorship, partnership, sub-chapter S corporation, or corporation. Select one of the above. It's really not very easy. Each choice has its advantages and disadvantages. Unless you've been in business before, it's hard to understand what the implications are for choosing any one of these types of organizations. But, if you choose the wrong type, it will spell trouble down the road.

Then there is the rubber stamp. It is my classic example of the types of things you have to do to run your own business. The rubber stamp is that thing which, when used with an ink pad, causes your business's name and address to be placed on an envelope. This is a small matter to take care of, but there are hundreds of these small matters to deal with.

Another example is the telephone company. First, you have to figure out what type of telephone service you want. You then have to get the telephone company to install it. Finally, you have to get them to make what they installed work. In my case, this was no easy task because my telephones are actually in Essex Junction, Vermont but they are connected 10 miles away in the Burlington, Vermont telephone exchange. When they were installed, they did not work. The reason was that it took five telephone men, all working out of different locations, to get them to work. When they finally got them running, they went dead two days later because of equipment failure. Then, a short time after that, the phones failed again because of a shorted cable pair.

Shall we talk about taxes? Let's.

Besides being a tax collector for the governments (federal, state, city), you must also contribute additional money to the taxes you collect. So, to the money you pay your employees, add an additional 6.13%. Also, add to that unemployment insurance and workman's compensation insurance, and you are now adding a factor of about 10% to your payroll. Then you will have to pay property taxes, income taxes on your business, plus just plain old ordinary multi-peril insurance on your business . . .man, that's a lot of money going out the door. Each and every item requires filling out a special form or application. None of it gives your employees any fringe benefits. That's extra.

According to a survey made in 1976 by Dun and Bradstreet, 98% of all businesses failed because they were poorly managed. Almost all of the businesses in the micro-computer field are small businesses. When we look . . . yes, indeed, it's just like Dun and Bradstreet said . . . they failed because of management problems.

Usually, when you think of a badly managed company, you think of a boss who pays his employees cheaply, works them too hard, and creates low morale. This is not often the case. It's all of the taxes, paper work, and business decisions that get them.

Had it not been for my experience with two other part-time businesses, I am certain that Lance Micklus, Inc. would have gone down the tubes by December 1979 - six months after it started operation. The chances are 50-50, based solely on statistics, that it will survive much more than a year.

So, the questions is not if Lance Micklus is the greatest TRS-80 programmer in the world. Rather, the question is if Lance Micklus is just a fairly good businessman.

I see a lot of people coming into micro-computing, striking out for all that gold out there in computerland. If you're one of them, here's some advice from a guy whose been there.

First, don't assume that just because you're a good programmer you are going to be successful. If you're like most people, you don't know how to make a living. That's why most people work for someone else who does know how to make a living.

Second, you are going to be operating a small business. Learn everything you can about running a business. It's more important that learning another computer language. If your business must have somebody who can write in FORTRAN, hire some smart guy who knows programming but hasn't yet figured out how to make a living for himself.

Third, surround yourself with good people. They're easier to find than you think. For example, if you want to find a good attorney, ask several successful small business operators who they would recommend.

Fourth, be prepared to work extremely long hard hours, especially in your first year of operation. You must be the kind of person who will work 70 to 80 hours per week without anybody standing over you saying, "Work. Work! Work!!" It means on a nice sunny summer day, when your kids want you to take them swimming, you say, "No." It means that on Christmas day, after the presents are all opened, you go back to the office to balance the checkbook.

Fifth, don't go into business if you're easily depressed. Believe me, there are times I've gone to bed telling myself, "This will never work. My company is not working out. We're going to go broke. I'd better close up now while there's still a little money left or I'll go totally in the hole."

When I first started marketing my programs through TSE a year and a half ago, I used to worry about competitors. Since being in business for myself, I don't worry any more. Because I know that very few of them are good businessmen. So, they can't really hurt me. The only enemy I have is myself. Can I cut the mustard? Boy I sure hope so.

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SUCCESS WITH TRS-80* CASSETTES

by John Victor

Computer audio cassettes have a bad reputation with computer owners–and for good reason. Many unsuspected TRS-80* users have spent countless hours of frustration trying to load programs from commercially recorded cassettes or trying to figure out how to record their own programs on cassette. It is no wonder that many abandon their cassette systems for disk systems at the first opportunity. This is unfortunate. The TRS-80* cassette system can be just as reliable as the disk system, and in some ways is better than disk for program and data storage.

The TRS-80* cassette-based system is half the price of the disk system–a budget-minded hobbyist or school system may have chosen the TRS-80* because of price. Second, the audio cassette is much more durable than a floppy disk. Cassettes can be dropped or handled carelessly without being damaged; floppies, on the other hand, are more like rare butterfly specimens. Any abuse at all can destroy programs or data files.

Another consideration is system reliability. A 16K TRS-80* system is simple and fairly reliable. An upgraded 16K system with expansion interface and floppy disk drives appears to be jerry-built--things don't fit together very well. The more components are added to this system, the less reliable it becomes, so that the disk system loses data, or crashes at the wrong moment.

The TRS-80* Cassette Recording Format

The TRS-80* stores programs on cassette tape in the form of binary numbers made up of 0's and 1's. Each binary number (or byte) consists of 8 of these digits. For example, the number 160 is written 10100000 in binary. To store the number on cassette, the computer feeds on digit at a time into the cassette player for recording. When the program or data is loaded back into the computer, each binary digit is sent back into the computer one at a time.

Each personal computer uses its own method of recording a 0 or 1 on cassette tape. The TRS-80* uses a 'rhythm' method. Figure 1 shows how it works.

The TRS-80* sends out clock pulses at regular intervals. These set up a timing scheme. Data or program pulses fall between the clock pulses. If the computer sees a pulse between the clock pulses, it records a 1. If it sees nothing between the clock pulses, the computer counts this as a 0.

The clock pulses can be thought of as the down beat on a drum (1,2,3,4, etc.). The data pulses can be thought of as an upbeat strike (1, and 2, and 3, and, etc.).

The big advantage of this system is that it is self-clocking. The cassette player used to store and load the programs back into the computer can run at different speeds without affecting program loading. As long as the computer can count the clock pulses, the data will load back into the computer without problems.

Audio recording equipment is not comfortable with the kinds of signals that come out of computer electronics. Computer signals are in the form of square waves with sharp corners. Audio electronics tend to round sharp square waves into sine waves because sharp signals are associated with unpleasant noise, while sine waves are associated with pure tones and music.

Because of the sharpness of computer signals, audio recording equipment will distort computer signals by rounding them off. In addition, because of the narrowness of the TRS-80* signals, this rounding process will also fatten them out when the signal is recorded.

However, the cassette interface in the computer can take these distorted signals and turn them back into square waves for the computer to work with. It can do this just so long as the clock pulses and the data pulses can be kept separate. Unfortunately, fattening of the pulses can push the clock and data pulses so close together that the computer loses the ability to tell them apart.

LEVEL I TO LEVEL II

When Radio Shack first came out with the TRS-80* computer, it used Level I BASIC that stored binary digits on cassette tape at a rate of 250 digits per second, or 250 baud. This system proved to be very reliable, but the people at Radio Shack obviously thought that 250 baud was too slow (the cassette system on the Apple computer works at 1500 baud). When Radio Shack came out with Level II BASIC, the recording speed was doubled to 500 baud.

Level I programs recorded at 250 baud are relatively easy to manufacture using high speed duplication equipment, even though this equipment distorts the heck out of the pulses. Distorted signals were not that serious since at 250 baud there is sufficient room between the clock and data pulses. However, doubling the recording speed leaves only half as much room between the pulses. The distortion of ordinary tape duplication equipment pushed the clock and data pulses too close together. Commercial tape duplication of Level II programs became almost impossible using standard methods, and TRS-80* users found that making their own cassettes became much more difficult at the new speed.

DIGITAL DUPLICATION

The key to duplicating Level II TRS-80* cassettes is to keep the pulses as narrow as possible so that the clock pulses do not crowd the data pulses. High speed audio duplication equipment of music uses an analog method of copying — the equipment tries to copy everything it hears. This is analogous to reproducing a page of typing on an office copier. It copies everything, including

coffee and tobbacco stains on the paper. More often than not, the office copier exaggerates the light blotches on the paper and makes everything look worse than the original.

Analog duplication of TRS-80* signals fattens out the pulses. It also exaggerates any defects in the original recording of the program. A little nose always comes in with the computer signal, and very often analog duplicators will pick up this noise and blow it up. Manufacturers that are using analog methods to duplicate TRS-80* cassettes use filters to remove this noise, but filters tend to distort the pulses.

Another waay to keep analog distortion within acceptable limits is to slow the duplication process down. The most common way to do this is to connect one TRS-80* computer to several recorders at once. This method can produce workable cassettes, but is hardly the professional way to record.

But even if the duplicator can keep the fattening process within limits, analog recording methods will always cause the end cassette user trouble.

The cassette user must turn his or her cassette player up loud enough to get the pulses to register in the computer. Analog-duplicated signals spread out when the volume is turned up, so that the volume that will load the program into the computer will fall into a small range that is not too load or too soft. Tapes that are duplicated with analog methods load at a small range of volume settings (that the user invarlably has trouble finding).

The best solution for commercial tapes is to record the signals on the tape digitally. This is like giving a handwritten copy to a typist who then retypes the page. It doesn't matter how bad the original looks just so long as it can be read. The digital duplicator first reads the original recording, and then it issues its own pulses to the cassette tape. This insures that narrow pulses are sent to the cassette tape, and it also insures that background noise will not find its way into duplicated copies.

The hallmark of digitally duplicated cassettes is that they load within a wide range of volume settings. This is because the pulses do not spread as much when the volume is increased.

Several cassette duplicators around the country now claim to be doing digital duplication. However, In a few instances, I have found that the so-called digital tapes were actually duplicated analog when the recording was checked out with an oscilloscope. (The scope showed fat pulses.) One duplicator who has the true digital process is Cook Laboratories of Norwalk, Connecticut.

THE CASSETTE PLAYER

Most cassette systems on personal computers were designed specifically to be used with inexpensive cassette players. However, there is a limit. It is my experience that the cassette players supplied with the TRS-80* systems are not adequate for serious applications. We use Panasonics and Sonys with good results.

The first problem with cheap cassette players is one of good mechanics. Cheap players often do not hold the cassette securely while it is playing. You can check this on your player by pushing down on one end of the cassette while you listen to it play. On really poor machines you can hear the differences in volume as the cassette rocks back and forth — these differences will be more than enough to cause tapes not to load properly.

Another problem is that the player heads on cheap machines are knocked out of alignment much easier than those of better machines (although any cassette player can have misaligned player heads). This causes the tape to be played at an angle, which "squashes" down the recorded pulses. The problems of head misalignment are the scourge of the computer cassette business since the user cannot diagnose the problem easily. The tapes may be perfectly good, but to the user the tape appears bad because of misalignment.

Head misalignment is a mischievous problem because the user can usually load some tapes some of the time. It is easier to blame the tapes than the cssette player.

Fortunately, there are ways to diagnose and cure head misalignment. The only thing needed is a small jjeweler's screw driver, a good quality TRS-80* tape, and an access hole drilled in the cassette player to allow the user to get at the head alignment screw. The user plays the tape and listens to the signals coming from the tape. All connections to the computer must be removed to so this! The screwdriver is then inserted into the access hole and inserted into the head alignment screw. As the screw is turned, the signal from the tape will become "bright", then gradually become muted. The point where the sinal sounds the brightest is closest to the correct player head alignment.

Another solution to the head alignment problem is the 'Peak Meter' manufactured by Cook Labs. This device measures the heights of the pulses coming from the tape as they are played back from the cassette player. The user simply inserts the plug from the meter into the ear jack of the cassette player. A special high quality calibration cassette (supplied by Cook Labs) is then played and the user turns the head alignment screw. The point where the meter pointer is at the highest level (where the pulses are at their highest) is where the head alignment is the most correct. The volume should not be changed while this is being done, but should be left at around midrange.

The Peak Meter can also instantly determine the proper volume at which to play a particular tape. Tapes are very often recorded at different volume levels, and users often have to resort to a frustrating trial and error search to find the correct level for a particular tape. This process can be done away with if the user has the Peak Meter. All that has to be done is to plug the computer connection into the Peak Meter while the meter is still hooked up to the cassette player. The signal will go through the meter and into the computer to load the program. The user watches the indicator on the Peak Meter and changes the volume until the pointer is near the middle of the dial. By using this device, I have never had to spend more than a

minute finding the correct volume for even poor quality tapes.

If the cassette player is used on a regular basis, the player heads must be cleaned and demagnetized at least once a week. Player heads are cleaned with anhydrous alcohol and cotton swab, and they are demagnetized with a special head demagnetizer. Both of these can be purchased in kits sold by Radio Shack or at an audio shop. If this maintenance is not done, the user will eventually start having loading problems since even an invisible coating of residue will significantly interfere with the signals coming from the cassette player. If the player heads become magnetized, it is possible for them to damage cassette tapes by putting noise on them.

RINGING

A poor quality cassette player may not be good enough to use with the TRS-80*. But there is also a problem if the cassette player is too good, such as would be with a $400 unit.

Cassette players that use expensive electronics tend to be very sensitive to changes in signals coming from the computer during the recording of a program. With the sharp pulses that come from the TRS-80* a good tape deck will 'overshoot' when it is recording the signals. That is, the signal will go too high or too low. As the recorder attempts to compensate for this overshoot, the signal will vibrate back and forth. This oversensitivity is called 'ringing'. Ringing is a problem in that it tends to distort the pulses, and sometimes the oscillations are mistaken by the computer for extra data or clock pulses.

The user can compensate for ringing by recording at a lower volume setting. However, this can be tricky if the user is not checking out what is being recorded with an oscilloscope.

If the user plans to make tape masters on reel-to-reel equipment for reproduction purposes, or plans to use a very good tape deck for data storage with the TRS-80*, then certain electronic modifications should be made on the equipment to eliminate ringing. These will require an audio expert, but they can be done.

TAPE

There are two common problems that occur with casette tape that the TRS-80* owner should try to avoid. The first problem is one of 'soft spots' or dropouts on the tape. Poor quality tape is not manufactured uniformly, so that parts of the recording medium may get too thin in sections of the tape. A dropout is potential land mine for the TRS-80* user since the computer cannot fill in gaps in a recorded program. If just one clock pulse gets recorded on a dropout, the computer may not see it when the program is played back. What happens then is the next data pulse may be seen as the clock pulse, and the computer misreads everything from that point on. You can actually see in many cases just where a dropout occurred because the program listing looks normal up to a point and then suddenly changes to what looks like computer 'garbage'.

The second problem with inferior tape is that the recording medium can flake off and foul the playback head of the cassette player. Poor quality tape is much more likely to do this than good tape, and when it happens, the user is also likely to get a dropout in the program.

Two materials commonly used as recording media for cassette tape are iron oxide and chrome oxide. These are magnetized in various places on the tape to produce the signals recorded on the tape. It is recognized in the recording industry that chrome oxide tape is superior to iron oxide tape due to its ability to record a wider range of sound frequencies (very important in the recording of music). However, chrome is also superior to iron tape for the recording of computer square waves. Chrome tape has a better 'transient response', which means that it can record sharper changes in signal frequency. This also means that it can record a narrower pulse than iron tape. In addition, chrome oxide tape is much less likely to have dropouts, and the tape seems to make better contact with the cassette player heads.

Our experience with chrome oxide tape has been excellent. We have been able to produce TRS-80* tapes that load within a range of volume settings from 3 to 7, even when the cassette player has some head misalignment. The only problem with chrome tape is that it is more expensive than iron, so that the user will simply have to decide which is more important–good recording or low cost.

Another possible problem with chrome oxide tape for those TRS-80* owners who are using the Radio Shack cassette unit is that the unit does not have enough 'juice' to record over a previously recorded tape. If the user wants to record and re-record on chrome oxide tape using this unit, he or she will have to erase the tapes with bulk eraser before re-recording on a previously used tape.

The user can tell if a tape is chrome oxide by the color–iron tape is brown, while chrome oxide tape is purple-black in color.

SUMMARY

The TRS-80* cassette recording format can pose problems to both the commerical software publisher and the TRS-80* owner. However, a little understanding of how the system works can produce miracles for everyone concerned. The first step is to use an adequate quality cassette player on which the user performs regular cleaning and head alignment. The second step is to use good quality cassette tape (preferably chrome oxide tape). Commercial tapes should be duplicated using digital methods rather than the analog duplication methods used for recording music.

Cassette based systems have the advantage of being simple and cheap. With knowledge and understanding they can also be very reliable.

A SCIENCE OR AN ART? by Ron Potkin

Is computer programming a science or an art? I believe it is an art. Websters Dictionary defines ART as:

"Creative work or its principles; making or doing of things that display form, beauty or unusual perception: it includes painting, sculpture, architecture, music, literature, drama, the dance, etc."

Does this not also describe a computer program? Have you not read a program written by someone else and sensed a feeling of elation as you studied the methods and principles used which showed a mastery of the language? Form, beauty and perception is a creation of the mind — and how could you better describe programming?

You may have had the opportunity to watch a wood sculptor at work. He starts with a block of wood. He has already studied the grain and its texture and he is able to visualise the shape of the object he intends to create. Watch him closely as he approaches each cut with a sureness and precision which comes only with many years of experience. He knows exactly which chisel or gouge to use and keeps them honed to perfection. And, always, he has that final creation in his mind.

A computer program, however, is different. We can load a tape and see immediately the work of an artist. The program shows a polish, a smoothness and a flow which puts it several levels above other programs.

Unlike most other art forms, we have an advantage because we can go behind the scenes, as it were, and see the master at work. We can study his methods and the tools he used and the pains he took to create that work of art. We can emulate his ideas and maybe, one day, achieve the same level of perfection.

Therefore I urge you, if you are an avid programmer, eager to understand the finer points of your computer, to take the time to study the work of those whose programs you admire. If you have spent several hours typing in a program from "SoftSide", do not despair and become frustrated because it refuses to work. Take the time to find your errors; study those complicated subroutines.

How do you know if the program was written by a professional? Believe me, you'll know as you study its inner workings and your own programs in the future will be all the better for that effort.

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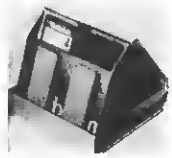

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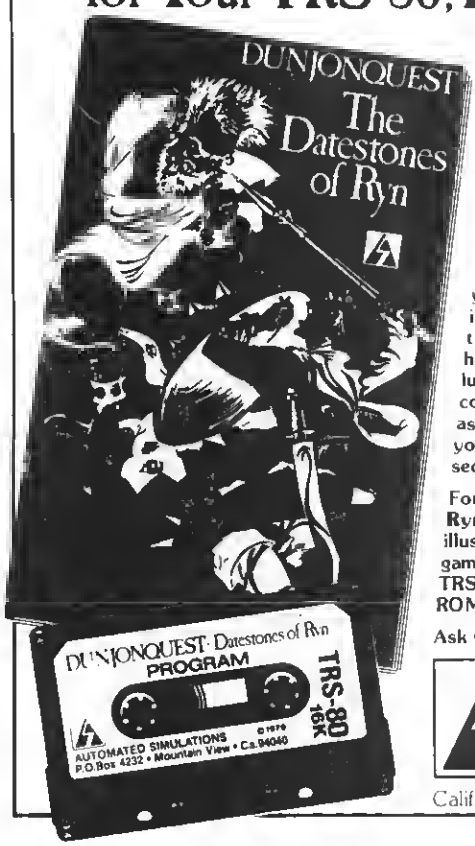

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